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[12] PATENT DESCRIPTION OF PRACTICAL NEW MODEL

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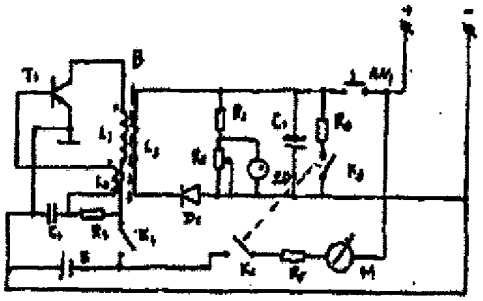
[54] Name of Practical New Model:

Multi-Purpose Priming Device

[57] Abstract:

A multi-purpose priming device that consists of two parts: a charge and discharge circuit, and a testing circuit. The said device charges capacitor with rectified high frequency oscillation voltage, and primes the detonation cap with current discharged from the capacitor. In addition, the built-in testing circuit can conduct testing on the boundary of the detonating cap. This new model which features simple configuration, compact size, light weight, and multi-purpose within a single device can be widely used for both military and commercial blasting purposes.



PATENT CLAIMS

1. A multi-purpose priming device that uses the capacitive discharge circuit to prime the detonation cap. The said device features two parts: a charge and discharge circuit, and a testing circuit. The charge and discharge circuit consists of a triode T1, a transformer B, a capacitor C2, and a diode D1 where the triode T1 and the resistor R1, the capacitor C1, and the L1 and L2 coils of the transformer B form an oscillation circuit. The collecting electrode of the said T1 is connected to L1, the transmitting electrode is connected to ground, and the base electrode is connected to the same-named end of L2 to form a regenerative feedback loop. The other end of L2 is connected to the negative terminal of the power source via resistor R1 which is a bias current resistance. L3, D1, and C2 form a half-rectifying charge circuit supplying detonating voltage from C2. The output end of C2 is, via AN1, connected to the "+" terminal while the other end is directly connected to the "-" terminal. The testing circuit comprises series connected current meter M, resistor R5, and switch K2. After that, one end thereof is connected to the "+" terminal while the other end is connected to the negative terminal of the power source. One end of the power source E is grounded while the other end is connected to the end of K1 and K2.

2. According to the priming device described in Claim 1, it features an indicator circuit for charge completion. The said circuit consists of an indication light ZD, a resistor R2, and a potentiometer R3 where R2, R3 are in series and connected to C2 while ZD is connected in parallel to R3.

PATENT DESCRIPTION

Multi-purpose Priming Device

This practical new model involves a modified priming device which belongs to the blasting technology category.

During the blasting operation, the explosive material needs to be detonated by a priming device. There are a huge variety of priming devices in use nowadays. However, no matter which category they belong to, their sole role is limited to detonation. In addition, the blasting industry also uses an instrument to check the shot hole network to see whether they are connected in a proper manner. For this purpose, devices such as the bridge-type ohmmeter and compact resistance meter are used which are single-function, larger sized, and inconvenient for transportation and operation.

The purpose of the said practical new model is to develop a simple, compact, and multi-purpose priming device.

The purpose of the said practical new model is to consolidate the device for detonation and the instrument for testing. The new model is implemented by re-designing its circuit.

The following is a detailed description of the practical new model with support of the attached drawing.

Fig. 1 illustrates the working principles of the said practical new model.

This practical new model uses the capacitive discharge circuit to prime the detonation cap. The said device includes two parts: a charge and discharge circuit, and a testing circuit. The charge and discharge circuit consists of a triode T1, a transformer B, a capacitor C2, and a diode D1 where the triode T1 and the resistor R1, the capacitor C1, and the L1 and L2 coils of the transformer B form an oscillation circuit. The collecting electrode of the said T1 is connected to L1, the transmitting electrode is connected to ground, and the base electrode is connected to the same-named end of L2 to form a regenerative feedback loop. The other end of L2 is connected to the negative terminal of the power source via resistor R1 which is a bias current resistance. The booster coil of L3, D1, and C2 form a half-rectifying charge circuit supplying detonating voltage from C2. The output end of C2 is, via AN1, connected to the "+" terminal while the other end is directly connected to the "-" terminal. The testing circuit comprises series connected current meter M, resistor R5, and switch K2. After that, one end thereof is connected to the "+" terminal while the other end is connected to the negative terminal of the power source. One end of the power source E is grounded while the other end is connected to the end of K1 and K2. It supplies power to the charge and discharge circuit and the testing circuit. The charge and discharge circuit also contains a discharge resistance R4 which is connected through K3, with the purpose of releasing the residual charge C2 after the detonation is completed.

In order to show the charge and discharge status to the operator, the said practical new model

also introduces an indicator circuit for completion of charging. The said circuit consists of an indicator light ZD, a resistor R2, and a potentiometer R3 where R2, R3 are in series and connected to C2 while ZD is connected in parallel to R3. ZD is a neon (firing) tube which regulates R3. It can regulate the C2 charge value reflected by the neon tube.

The parameters of the components in this practical new model are determined based on the following principles: For the transistor T1, high power triode with a reverse voltage of 80V and a working current of 4A should be used. It can be a germanium triode or a silicon triode such as 3AD and 3AB series. For the neon tube, the firing voltage should be around 70V. The core of the transformer B is made of ferromagnetic material. L1 has 20-25 coils, L2 has 10-15 coils, and L3 has 600-700 coils. For D1, high reverse voltage diode should be used. The current meter range is 1mA, and the power supply should be 3V, etc.

The detonating voltage of the priming device produced according to the said practical new model is about 400V. In the range of a 1-kilometer long trunk line, it can effectively detonate 50 shots in series and 5 shots of nickel-chrome filament electric detonation caps connected in parallel. The said device is compact in size - only one eighth of the conventional equipment – and is very convenient to carry around. When in use, connect the detonating cord, connect the firing head of the trunk cord to the terminal of this device. K2 and K3 should be connected while K1 is disconnected. Use the testing circuit to check the wire connections to see if they are properly connected (it can also be used for other testing purposes). Then disconnect K2 and K3, and connect K1. At this time, the charging starts. When the charge reaches 400V, the indicator light ZD will lit, indicating completion of the charging process. Then press AN1. Charge stored in C2 will be discharged into the detonation cap and cause firing.

This practical new model features simple configuration, compact size, light weight, and multi-purpose within a single device. It can be widely used in industries such as strip mining, urban demolition, and military blasting.

DRAWING OF DESCRIPTION

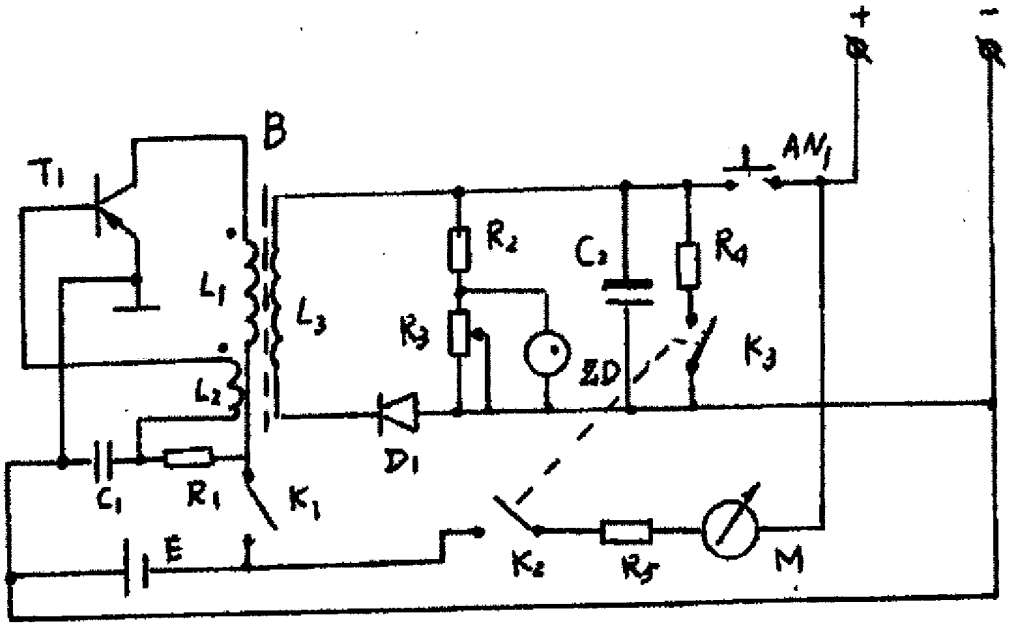


Fig. 1